

MULTI-SENSOR EVENT CORRELATION SYSTEM

[0001] This application is a continuation of U.S. Utility patent application Ser. No. 16/460,961, filed on 2 Jul. 2019, issued as U.S. Pat. No. 10,748,581, which is a continuation of U.S. Utility patent application Ser. No. 15/824,998, filed on 28 Nov. 2017, issued as U.S. Pat. No. 10,339,978, which is a continuation of U.S. Utility patent application Ser. No. 15/471,742, filed on 28 Mar. 2017, issued as U.S. Pat. No. 9,830,951, which is a continuation of U.S. Utility patent application Ser. No. 15/184,926, filed on 16 Jun. 2016, issued as U.S. Pat. No. 9,607,652, which is a continuation in part of U.S. Utility patent application Ser. No. 14/801,428 filed 16 Jul. 2015, issued as U.S. Pat. No. 9,406,336, which is a continuation in part of U.S. Utility patent application Ser. No. 14/549,422 filed 20 Nov. 2014, issued as U.S. Pat. No. 9,235,765, which is a continuation in part of U.S. Utility patent application Ser. No. 14/257,959 filed 21 Apr. 2014, issued as U.S. Pat. No. 9,076,041, which is a continuation-in-part of U.S. Utility patent application Ser. No. 13/914,525, filed 10 Jun. 2013, issued as U.S. Pat. No. 8,702,516, which is a continuation in part of U.S. Utility patent application Ser. No. 13/679,879 filed 16 Nov. 2012, issued as U.S. Pat. No. 8,944,928, which is a continuation-in-part of U.S. Utility patent application Ser. No. 13/298,158 filed 16 Nov. 2011, issued as U.S. Pat. No. 8,905,855, which is a continuation-in-part of U.S. Utility patent application Ser. No. 13/267,784 filed 6 Oct. 2011, issued as U.S. Pat. No. 9,604,142, which is a continuation-in-part of U.S. Utility patent application Ser. No. 13/219,525 filed 26 Aug. 2011, issued as U.S. Pat. No. 8,941,723, which is a continuation-in-part of U.S. Utility patent application Ser. No. 13/191,309 filed 26 Jul. 2011, issued as U.S. Pat. No. 9,033,810, which is a continuation-in-part of U.S. Utility patent application Ser. No. 13/048,850 filed 15 Mar. 2011, issued as U.S. Pat. No. 8,465,376, which is a continuation-in-part of U.S. Utility patent application Ser. No. 12/901,806 filed 11 Oct. 2010, issued as U.S. Pat. No. 9,320,957, which is a continuation-in-part of U.S. Utility patent application Ser. No. 12/868,882 filed 26 Aug. 2010, issued as U.S. Pat. No. 8,944,826, the specifications of which are hereby incorporated herein by reference.

[0002] This application is a continuation of U.S. Utility patent application Ser. No. 16/460,961, filed on 2 Jul. 2019, issued as U.S. Pat. No. 10,748,581, which is a continuation of U.S. Utility patent application Ser. No. 15/824,998, filed on 28 Nov. 2017, issued as U.S. Pat. No. 10,339,978, which is a continuation in part of U.S. Utility patent application Ser. No. 14/801,428 filed 16 Jul. 2015, issued as U.S. Pat. No. 9,406,336, which is also a continuation in part of U.S. Utility patent application Ser. No. 13/757,029, filed 1 Feb. 2013, issued as U.S. Pat. No. 9,261,526, the specifications of which are hereby incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0003] One or more embodiments pertain to the field of sensors including environmental, physiological and motion capture sensors and associated data analysis and displaying information based on events recognized within the environmental, physiological and/or motion capture data or within motion analysis data associated with a user, or piece of

equipment and/or based on previous motion analysis data from the user or other user(s) and/or piece of equipment. More particularly, but not by way of limitation, one or more embodiments enable a multi-sensor event detection and tagging system that enables intelligent analysis, synchronization, and transfer of generally concise event videos synchronized with motion data from motion capture sensor(s) coupled with a user or piece of equipment. Event data including video and motion capture data are saved to database. Events including motion events are analyzed as they occur, and analysis of events stored in the database identifies trends, correlations, models, and patterns in motion event data. Greatly saves storage and increases upload speed by uploading event videos and avoiding upload of non-pertinent portions of large videos. Creates highlight reels filtered by metrics and can sort by metric. Integrates with multiple sensors to save event data even if other sensors do not detect the event. Events may be correlated and confirmed through multiple sensors and/or text/video on social media or other websites, and/or otherwise synchronized with image(s) or video, as the events happen or at a later time based on location and/or time of the event or both, for example on the mobile device or on a remote server, and as captured from internal/external camera(s) or nanny cam, for example to enable saving video of the event, such as the first steps of a child, violent shaking events, sporting, military or other motion events including concussions, or falling events associated with an elderly person and for example discarding non-event related video data, to greatly reduce storage requirements for event videos. The system may automatically generate tags for events based on analysis of sensor data; tags may also be generated based on analysis of social media site postings describing the event.

Description of the Related Art

[0004] Existing motion capture systems process and potentially store enormous amounts of data with respect to the actual events of interest. For example, known systems capture accelerometer data from sensors coupled to a user or piece of equipment and analyze or monitor movement. These systems do not intelligently confirm events using multiple disparate types of sensors or social media or other non-sensor based information, including postings to determine whether an event has actually occurred, or what type of equipment or what type of activity has occurred.

[0005] In these scenarios, thousands or millions of motion capture samples are associated with the user at rest or not moving in a manner that is related to a particular event that the existing systems are attempting to analyze. For example, if monitoring a football player, a large amount of motion data is not related to a concussion event, for a baby, a large amount of motion data is not related in general to a shaking event or non-motion event such as sudden infant death syndrome (SIDS), for a golfer, a large amount of motion data captured by a sensor mounted on the player's golf club is of low acceleration value, e.g., associated with the player standing or waiting for a play or otherwise not moving or accelerating in a manner of interest. Hence, capturing, transferring and storing non-event related data increases requirements for power, bandwidth and memory.

[0006] In addition, video capture of a user performing some type of motion may include even larger amounts of data, much of which has nothing to do with an actual event, such as a swing of a baseball bat or home run. There are no